

Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Diagnostics for Heavy Ion Beam Driven Warm Dense Matter Experiments¹ PAVEL NI, FRANCIS BIENIOSEK, MATTHAEUS LEITNER, WILLIAM WALDRON, Lawrence Berkeley National Laboratory — A set of diagnostic has been developed for the WDM experiments at the NDCX linear accelerator which is used as a driver for heating metallic targets. The diagnostics are aimed at the in-situ measurement of temperature, expansion velocity and pressure of a WDM sample. A specially developed three-channel pyrometer probes color temperatures at 750 nm, 1000 nm and 1500 nm, with 75 ps temporal resolution. The system has a broad dynamic range (black body), with a lower limit ~ 2000 K and upper limit ~ 100000 K. Continuous target emission from 450 nm to 850 nm is recorded by a custom spectrometer, consisting of a high dynamic range Hamamatsu streak camera and a holographic grating. The system is calibrated absolutely with a tungsten ribbon lamp (NIST traceable). Hydrodynamic expansion velocity of a target's free surface is measured by a commercially available all-fiber Doppler shift laser interferometer (VISAR).

¹This work performed under the auspices of the U.S Department of Energy by University of California, Lawrence Berkeley National Laboratory under contracts No. DE-AC02-05CH11231.

Pavel Ni
Lawrence Berkeley National Laboratory

Date submitted: 30 Jul 2008

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